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Synthesis , Characterization and Evaluation of Some Polyol Esters as Synthetic Lubricating Base Oils

A Thesis Submitted by

Mohamed Elsayed Haseeb Morgan

For the Degree of Ph.D. in Chemistry

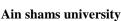
To

Department of Chemistry

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List Of Abbreviations

Flash Point	FP
Fourier Transform Infrared Spectroscopy	F.T.I.R
Modeular Compact Rhemoter	MCR
Mass Spectrum	MS
Neopentyl Glycol	NPG
Pour Point	PP
Poly Alpha Olefins	PAO
Polyalkylene Glycols	PAGs
Proton Nuclear Magnetic Resonance	¹ H-NMR
Thermogravmetric analysis	TGA
Total Acid Number	TAN
Trimethylol propane	TMP
Viscosity Index	VI

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Aim of work

The present work deals with preparation of complex esters and their use as synthetic base lubricating oils replacing mineral oils Preparation of new complex ester by using new catalyst Amberlyst 15 (ion exchange resin), the use of non conventional catalyst yields the derived products with negligible free acidity. The process has superiority with respect to easy handling, less reaction time ,lower molar ratio of acid to alcohol, energy saving and verifying yields of the order of 95% and above. Another advantage of these catalysts is that they can be recycled and used without loss of reactivity or decrease in yield. The advantages of complex esters are wide of viscosity range, high thermal and oxidative stability, high film thickness, surface activity, good biodegradability and low toxicity. They are active substitute for mineral oils. Engines in the contemporary time become a highperformance of which requires an oil sophisticated keep pace with

this development. capable oils to keep up with this development is the synthetic oils where mineral oils may not go along with this development. This is reflected well in the field of aviation which works by synthetic lubricating oils. Synthetic lubricating oils play an important role in the economies of the state in terms of their uses and important vitals where are used in special packaging conserved food which be used by man in his daily life. Nuclear stations does not fit the traditional use of mineral oils due to the presence of gamma rays that break the components of mineral oils causing problems, therefore it is necessary to use synthetic lubricating oils rather than these minerals. The stability of synthetic lubricating oils ordered them as the superior.

To achieve this goal, this work involved the following steps:

1-Esterification of dibasic acid with alkanols (amyl, 2-ethyl hexanol,hexanol and octanol.) by using new catalyst Amberlyst 15 (ion exchange resin).